TABLE 1.—*Monthly and annual temperature departures, 1929*

District	January	February	March	April	May	June	July	August	September	October	November	December	Average
New England	+0.5	+1.7	+4.8	+0.4	+1.3	+1.1	−0.4	−1.5	+1.6	−1.1	+1.5	−0.6	+0.8
Middle Atlantic	+1.2	+0.1	+6.7	+3.1	−0.5	+0.1	−0.6	−1.7	+1.4	−2.0	+1.4	+1.4	+0.9
South Atlantic	+3.0	−1.0	+4.8	+3.3	−0.4	−1.3	−1.2	−0.1	−0.2	−1.4	+1.8	+0.2	+0.6
Florida Peninsula	+3.3	+3.9	+3.2	+3.2	+1.6	−0.3	−1.1	+0.2	+0.6	−2.0	+3.5	+0.1	+1.4
East Gulf	+2.8	−2.8	+3.9	+3.5	0.0	−0.9	−0.8	+0.7	−0.4	−1.4	−0.4	−1.5	+0.2
West Gulf	+1.0	−7.4	+3.0	+3.7	−1.2	0.0	−0.6	+1.8	+0.9	+1.2	−6.0	+0.6	−0.2
Ohio Valley and Tennessee	−1.0	−5.0	+5.9	+3.3	−2.2	−1.6	−0.5	−2.2	−0.1	−2.0	−2.1	+0.6	−0.6
Lower Lakes	−1.3	−1.8	+7.9	+2.9	−1.9	−1.4	−0.1	−2.6	+1.2	−1.9	−1.2	−1.5	−0.1
Upper Lakes	−6.2	−4.1	+6.0	+2.4	−2.2	−2.4	+0.6	−1.0	−0.3	−0.8	−3.0	−1.4	−1.0
North Dakota	−9.3	−4.6	+8.2	+0.8	−4.6	−0.9	+2.6	+3.2	−4.5	+3.2	−1.6	−1.2	−0.7
Upper Mississippi Valley	−7.8	−6.7	+5.8	+2.3	−3.1	−2.2	+0.4	−0.7	−1.5	−0.2	−4.0	+0.6	−1.4
Missouri Valley	−7.2	−7.1	+5.8	+2.2	−2.2	−1.3	+1.5	+2.3	−2.7	+1.2	−4.5	+1.7	−0.9
Northern Slope	−8.5	−8.0	+3.7	−1.7	−1.8	−0.5	+3.0	+5.0	−4.4	+2.5	−3.7	+2.3	−1.0
Middle Slope	−3.1	−8.0	+2.9	+1.8	−2.3	+0.5	+1.0	+2.4	−1.8	+0.6	−7.2	+3.2	−0.8
Southern Slope	+0.7	−6.6	+1.0	+3.1	−2.3	+1.5	−0.4	+2.7	+0.2	+1.3	−7.0	+1.6	−0.4
Southern Plateau	−0.2	−3.5	−0.4	−0.5	+1.2	+1.4	+1.4	+1.2	+1.5	+2.5	−1.4	+4.2	+0.6
Middle Plateau	−2.5	−6.3	−0.4	−3.7	+1.4	−0.1	+2.7	+3.1	−1.0	+2.6	−1.9	+7.0	+0.1
Northern Plateau	−8.6	−10.7	+0.8	−3.4	+0.5	−0.6	+1.7	+4.9	−2.2	+2.7	−3.4	+5.6	−1.1
North Pacific	−4.3	−4.0	+0.4	−2.8	+0.2	+0.2	+0.9	+1.5	+1.8	+3.6	−0.8	+2.5	−0.1
Middle Pacific	−3.1	−1.4	0.0	−2.6	+0.5	+1.5	+1.1	+1.5	+0.5	+2.2	+1.2	+3.4	+0.4
South Pacific	−0.8	−1.6	−0.3	−2.0	+2.3	+0.8	+0.9	+3.1	+1.1	+4.0	+3.4	+4.9	+1.3
United States	−2.4	−4.0	+3.5	+0.9	−0.7	−0.3	+0.6	+1.1	−0.4	+0.7	−1.7	+1.6	[1] −0.1

[1] Annual departure.

TABLE 2.—*Precipitation departures, monthly and annual, 1929*

District	January	February	March	April	May	June	July	August	September	October	November	December	Year
New England	−0.2	+0.3	0.0	+2.3	+0.6	−0.8	−1.9	−0.8	−0.6	−0.7	−0.4	+0.4	−1.8
Middle Atlantic	−0.7	+0.6	−0.6	+2.0	+0.3	+0.4	−2.4	−1.9	+0.8	+2.1	+0.2	−0.7	+0.1
South Atlantic	+0.1	+2.5	+0.9	+0.1	+1.7	−0.2	+0.2	−1.2	+3.7	+2.1	+0.5	+0.3	+10.7
Florida Peninsula	−0.9	−0.8	+0.9	0.0	+1.5	−0.8	+2.2	0.0	+4.8	+3.9	−1.2	+3.6	+13.2
East Gulf	+0.8	+2.3	+5.8	+0.6	+1.3	+1.2	−0.8	−1.3	+2.8	+0.7	+4.5	−2.0	+15.9
West Gulf	+0.4	−0.9	+0.1	0.0	+4.9	−1.4	0.0	−2.1	−1.0	−0.5	+1.0	−0.4	+0.1
Ohio Valley and Tennessee	+0.3	−0.4	−0.3	+0.8	+3.1	+0.1	+0.4	−1.4	+0.6	+1.3	+1.1	−0.5	+5.1
Lower Lakes	+1.0	−0.8	+0.3	+3.0	+0.6	−0.8	+0.3	−1.1	−0.4	+0.7	+0.1	+0.8	+3.7
Upper Lakes	+1.5	−1.0	+0.3	+1.7	−0.3	−0.2	−0.8	−1.4	−0.9	+0.4	−0.9	−0.2	−1.8
North Dakota	+0.3	−0.2	+0.3	+0.2	−0.4	−2.0	−0.9	−1.3	0.0	+1.0	−0.1	+0.2	−2.9
Upper Mississippi Valley	+1.4	−0.3	+0.6	+1.1	−0.4	−0.3	+0.6	−1.1	−0.5	+0.4	−0.8	−0.7	0.0
Missouri Valley	+0.7	0.0	0.0	+1.4	+1.0	+0.1	−0.9	−1.4	−0.8	+2.2	−0.4	−0.7	+1.2
Northern Slope	0.0	0.0	+0.4	+0.8	−0.5	−0.8	−0.4	0.0	+0.3	0.0	+0.1	+0.3	+0.2
Middle Slope	+0.3	−0.1	+0.2	+0.6	+0.5	0.0	+0.5	−0.9	−0.2	+0.7	+0.4	−0.5	+1.5
Southern Slope	−0.4	−0.1	+0.6	−1.2	+0.8	−1.2	−0.3	−0.9	−0.4	+0.2	−0.4	−0.3	−3.6
Southern Plateau	−0.4	−0.2	−0.3	−0.3	+1.1	−0.2	+0.1	+0.5	+0.6	0.0	−0.2	−0.6	+0.1
Middle Plateau	−0.1	−0.2	−0.1	+0.4	−0.8	−0.1	+0.3	+0.1	+0.4	−0.5	−0.6	−0.4	−1.6
Northern Plateau	+0.3	−1.0	−0.4	+0.1	−1.0	+0.3	−0.5	−0.2	−0.4	−0.7	−1.4	+0.1	−4.8
North Pacific	−3.5	−4.0	−0.5	+0.2	−0.9	+0.5	−0.2	−0.3	−2.0	−1.8	−4.9	−0.2	−17.6
Middle Pacific	−2.8	−2.2	−1.9	−0.6	−0.9	+1.1	0.0	0.0	−0.6	−1.2	−2.8	−0.2	−12.1
South Pacific	−1.2	−0.9	−0.3	+0.1	−0.4	+0.1	0.0	0.0	+0.1	−0.6	−1.0	−1.8	−5.9
United States	−0.1	−0.4	+0.3	+0.6	+0.6	−0.2	−0.2	−0.8	+0.3	+0.5	−0.3	−0.2	+0.1

NOTES, ABSTRACTS, AND REVIEWS

Aspects of surfaces of discontinuity (by C. K. M. Douglas (Roy. Meteorolog. Soc., J. 55, pp. 123–147, Disc., 147–151, April, 1929)).—Among the chief points discussed are: (1) Factors tending to produce sharp fronts at the earth's surface. (2) Examples of sounding of upper air temperature through rainy fronts. It is found that the surface of discontinuity is normally smoothed through a layer about a kilometer thick, inversions being rare, especially in deep depressions. It is thought that some rain belts, with associated fronts resembling "occlusions," are developed in polar air, and are not strictly "occlusions" at all. (3) Warm sectors are not surface phenomena, but are of fundamental importance in determining the upper air conditions over depressions. The fall of pressure in the warm sector in a deepening depression must be due to the spreading over of air from higher latitudes in the upper part of the troposphere and in the stratosphere. The corresponding feature of a developing anticyclone is a spreading over of tropical air at high levels. (4) Subsidence is discussed quantitatively. The development of inversions with dry air above them (comprising a very large percentage of all inversions in the troposphere above 500 meters) is considered to be due to subsidence combined with turbulence up to a definite limit. Cloud particles and precipitation are important in preventing dynamical warming at a fixed level by subsidence. (5) Sixteen striking wind discontinuities observed by pilot balloons in the British Isles in the last nine years are given, with remarks on their relation with fronts and surfaces of subsidence. (6) Turbulence at sloping surfaces of discontinuity is discussed on the basis of a criterion due to L. F. Richardson. (7) The overrunning of warm air by cold air is referred to, and it is thought that except near the ground this takes the form of continuous rather than of discontinuous motion. It is shown that a vertical front of any appreciable magnitude must be very much

smoothed out. An appendix is added dealing with the combination of rotary and translatory motions. The general line of argument is that the more important pressure changes are due mainly to large-scale horizontal movements at high levels, considered in conjunction with movements at lower levels. When depressions grow deeper the resulting convergence in the lower levels influences the subsequent behavior of already existing fronts, and in certain cases forms new fronts. When anticyclones develop, the subsidence causes inversions to form which are entirely different from frontal surfaces, and in addition the divergence may sharpen up fronts at the boundaries of the anticyclones. In the discussion, J. S. Dines referred to the view held a long time back by W. H. Dines, that the cause of a depression was to be found at the base of the stratosphere.—R. S. READ. (Reprinted from Science Abstracts, No. 3279.)

The lowest temperature on the Earth[1] (*by E. Rubinstein (abstract translated by A. I. Krynitsky, United States Bureau of Standards)*).—All the data show that the lowest temperature on the globe (excluding upper layers of the atmosphere) is in the city of Verkhoyansk. The figures given by various authors are somewhat different. They fluctuate between −69.8° C. and −72° C.

It should be pointed out that in some cases the alcohol thermometers were not calibrated. This discrepancy in figures was a cause of an inquiry from the observatory of the Washington Weather Bureau in October, 1915.

Director of our observatory, B. B. Galitzin, pointed out the causes of this discrepancy and gave the temperature minimum −68° C. (round figure).

Galitzin's letter was published in full in the MONTHLY WEATHER REVIEW in August, 1917, volume 45, page 407 (B. Galitzin, "Lowest Air Temperature at a Meteorological Station"). The observations in Verkhoyansk from 1884 to 1892, inclusive, were made using the alcohol thermometer which was not checked at the low temperatures. It was found, however, that the alcohol thermometers differed from the mercury thermometers only in decimal points.

The author believes that the most reliable absolute minimum of temperature observed on the earth is −67.8° C. (−90.0° F.).

NOTE.—In contrast to the above it is interesting to note that the highest temperature ever reported, with standard thermometers and instrument shelter, 134° F. (−56.7° C.), occurred July 10, 1913, at Greenland Ranch, Death Valley, California, 178 feet below sea level.—EDITOR.

Great daily range of temperature near Rialto, Calif. (by Albert W. Cook, Redlands, Calif).—The greatest range in temperature ever recorded at any of the twenty-odd orchard stations of the Redlands fruit-frost district occurred on November 18–19, 1929, at Rialto, a subdivision of the district. The fruit-frost records extend from November 1 to March 1 and cover the past eight seasons. Shortly after 2 p. m. on November 18 a maximum temperature of 91° F. was recorded and by 6 o'clock the next morning the temperature had fallen 60° and frost occurred. The minimum was 30.8° F. These temperatures were recorded in a fruit-region instrument shelter located in a mature orange grove, clean cultivated, and over sandy soil.

A range of 60° is in itself remarkable, but when it is considered that the temperature drop from "summer heat" to a frost it becomes even more striking. There was, however, no deposit of white frost because of the extreme dryness of the air.

There had been no appreciable amounts of rain for several months and the soil was a dry powder. Atmospheric moisture was low for some time preceding the day in question. These conditions, coupled with almost a calm night, were conducive to a large range in temperature. The range was 50° or more for three days before the extreme range was recorded.

Monthly Weather Review Supplement No. 33, The Climate of Mexico (by John L. Page, University of Illinois).—Doctor Page presents a much condensed account of the climate of Mexico prepared from all of the data now available, most of which he personally compiled when on a two months' visit to the Federal Weather Service of Mexico. The publication contains no tables of climatic data; reliance is placed wholly upon a very complete series of charts and graphs. It is the most complete presentation of the subject in the English language. The supplement can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the nominal price of 15 cents the copy.—*A. J. H.*

Meteorological summary for Chile, November, 1929 (by J. Bustos Navarrete, Observatorio del Salto, Santiago Chile).—Atmospheric circulation had but little activity in the month of November. The most important periods of unsettled weather came near the middle of the month when three depressions crossed the extreme southern region. These depressions were charted during the periods 9th–10th, 11th–12th, and 13th–14th; all brought unsettled weather and rain over the entire southern zone.

The anticyclones of major importance were mapped in three periods—1st–8th, 17th–20th, and 23d–26th; the centers followed parabolic paths beginning near the Juan Fernandez Islands, recurving near Chiloe, and moving toward Argentina.

In the central zone the warmest weather occurred in the latter half of the month; readings above 86° F. were reported between Santiago and Chillan.—*Translated by W. W. R.*

Revista de meteorológia y aerologia. Tacubaya, D. F., Mexico.—On the editorial page of the first issue (December, 1929) the program of this publication is announced as follows:

> To set forth our criterion relative to the method of studying the principal problems of our (Mexican) territory, especially those relating to the forecasting of the weather, and to suggest the most adaptable form of statistical data to promote the related discussion.
>
> To publish the writings of the best-known foreign meteorologists on the general problems of meteorology, especially those that have great similarity to problems affecting our country.
>
> To disseminate those interested in the compilation of meteorological data and to the public that is interested in forecasts of the weather by the *Servicio Meteorológico Mexicano*, elementary scientific instruction and internationally established terms used in the science to the end that there may accrue greater profit and better interpretation relative to such information.

—*W. W. Reed.*

[1] (In Russian) Bull. de l'Observatoire Géophysique Central, No. 1, Leningrad, 1927.